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ON PROFESSOR TYNDALL'S RECENT ADDRESS.

By THOMAS DAVIDSON.

The recent address of the President of the British Association delivered at Belfast is intended to be a general account of the history and principles of Materialism, whereof Professor Tyndall is one of the most distinguished and certainly one of the most eloquent expounders. In making a few criticisms upon it, I shall not follow those persons who have discussed its bearing upon religion and existing institutions, or its tendency generally, but shall confine myself to questions of historic fact and undeniable philosophic truth.

There was a time in the history of Materialism when its adherents eagerly inquired "*Qui nous délivrera des Grecs et des Romains?*" Now-a-days, *on a changé tout ça*, and Materialism is looking for antiquities, to give it prestige, among the fragments of the early philosophers of Greece and Rome, and dragging from their obscurity such names as Empedokles and Demokritos to set off against those of Plato and Aristotle. Like Dr. Büchner, Professor Tyndall opens his address with a sketch of the history of Materialism,* beginning with Demokritos, and therein takes occasion to speak depreciatingly of those thinkers who have maintained other doctrines, and especially of Aristotle, whom he charges with "what we should consider some of the worst attributes of a modern physical investigator—indistinctness of ideas, confusion of mind, and a confident use of language"—adding that his "errors of detail were grave and numerous."

Taking up first this portion of the Professor's address, let us see whether he, with over two thousand years more of "organically remembered" experiences than Aristotle, be entirely free from those same faults. And first as regards matters of historic detail.

(1.) In speaking of the doctrines of Demokritos, Professor Tyndall says: "The varieties of all things depend upon the varieties of their atoms in number, size, and aggregation." Now, all that we know about this matter, we know, either

* Borrowed, often *verbatim*, from Lange and Draper.

directly or indirectly, through Aristotle; and he is at pains to tell us that, according to Demokritos, the varieties of all things depend upon the varieties of their atoms in figure, aggregation, and position—*ῥυσμός, διατεγή, τροπή*—which Aristotle renders into his own terminology by *σχῆμα, τάξις, θέσις* (Metaph. A. 5).

(2.) A little farther on, we are told: "Empedokles,* a man of more fiery and poetic nature [than Demokritos], introduced the notion of love and hate among his atoms, to account for their combination and separation. Noticing this gap in the doctrine of Demokritos, he struck it with the penetrating thought, linked however with some wild speculation, that it lay in the very nature of those combinations which were suited to their ends (in other words, in harmony with their environment) to maintain themselves, while unfit combinations, having no proper habitat, must rapidly disappear. Thus more than two thousand years ago the doctrine of the 'survival of the fittest,' which in our day, not on the basis of vague conjecture, but of positive knowledge, has been raised to such extraordinary significance, had received at all events partial enunciation." Reading this passage, one would certainly conclude that Empedokles wrote after Demokritos and with a knowledge of the doctrines of the latter. Now, there is not a shadow of proof for either of these assumptions. Empedokles belonged to Agrigentum in Sicily, and was, according to the best authorities, born about B.C. 492, while Demokritos belonged to Abdera in Thrace, and was born about 460. As Empedokles died at the age of sixty, Demokritos could hardly have been more than twenty-eight years old at the time of that event. As he is known to have made long journeys previous to writing his works, it is hardly credible that any of these could have reached Empedokles in Agrigentum. And, indeed, the writings of Empedokles show no traces of the influence of Demokritos: they belong to an older period of thought. There is no trustworthy proof that he propounded a doctrine of atoms at all. His extant fragments lead to the very opposite conclusion. He believed in the existence of four elements, combining and separating

* I have taken the liberty of using, for uniformity's sake, the Greek orthography of Greek proper names.

through the influence of love and hate, which however were not inherent in the elements, but outside and independent of them. Nowhere does Empedokles hint that those combinations of atoms which are suited to their ends maintain themselves, while unfit combinations disappear. He held, that of organisms the plants sprang first from the earth, then the animals. Not, however, whole animals, but separate limbs, which afterwards came together by chance, according as guided by love or hate. In the former case, monsters were produced; in the latter, natural products. It must require a wonderfully "scientific use of the imagination" to find any resemblance between this theory and the modern one of the "survival of the fittest." Thus, in the above quotation, there is not a single correct statement.

Passing over the accounts of Epikouros and Lucretius, which are not above criticism, we come to the following:

(3.) "During the centuries between the first of these three philosophers [Demokritos] and the last, the human intellect was active in other fields than theirs. The Sophists had run through their career. * * * * Pythagoras had made his experiments on the harmonic intervals." Who would read this and not suppose that Pythagoras lived between Demokritos and Lucretius? And yet Pythagoras was dead long before Demokritos (probably even before even Empedokles) was born. He is thought to have been born B.C. 582, which would make him ninety years old at the birth of Empedokles, if he was then alive.

This may suffice to show the accuracy of Prof. Tyndall's acquaintance with those pre-Aristotelian philosophers whose views he sympathizes with and considers the forerunners of his own. I doubt whether his errors of detail be not grave and numerous, and whether he be not fairly chargeable with "indistinctness of ideas, confusion of mind, and a confident use of language." But these faults become even more prominent when he comes to speak of Aristotle, with whom he does not sympathize, but whom he treats very much as George Henry Lewes does.

(4.) Prof. Tyndall tells us that "Aristotle put words in the place of things,* subject in the place of object."† It is

* Cf. Whewell, *Hist. of Inductive Sciences*, vol. i. p. 67.

† Cf. Lewes, *Aristotle*, p. 238.

curious to compare the former of these assertions with one of Prof. Steinthal's (*Gesch. der Sprachwissenschaft bei den Griechen und Römern*, pp. 197 sqq.): "From what has been said, we see that it is not notions or words that, according to Aristotle, are spoken, but objects. The object *animal* is said of the whole object *horse* (i.e. of course, of every horse)." Both assertions are equally untrue. Aristotle distinguishes perfectly well, not only between words and things, but between words and thoughts. In the first chapter of the work *On interpretation*, we read: "The modifications of the voice are the symbols of modifications in the soul, and written characters are symbols of the modifications of the voice. And as all peoples have not the same written characters, so all have not the same articulate sounds, whereas the corresponding modifications of the soul and the external facts which these represent are the same for all." As to the second assertion, that Aristotle put subject in the place of object; if we persist in translating Aristotle's word for *subject* (*ὑποκείμενον*) by *object*, that is our fault, not his. The present use of the words *subject* and *object* came in with Kant and Fichte. Trendelenburg, *Elementa Logicæ Aristotelicæ*, p. 55, note, says: "Apud Germanos, Kantio potissimum et Fichtio auctoribus, horum verborum *usus plane inversus est*." To-day we follow the German usage.

(5) Prof. Tyndall proceeds: "He [Aristotle] preached induction without practising it." This statement is borrowed from Lewes' *Aristotle*, p. 113. It is untrue notwithstanding, as any one acquainted with Aristotle's *Logic*, which rests entirely upon induction, well knows. It is true that Aristotle makes hasty and incorrect inductions; but in this respect Bacon, the falsely reputed father of induction, was even inferior to him. Lewes, *ut sup.*, says: "Bacon did not attack the Method which Aristotle *taught*; indeed he was very imperfectly acquainted with it." * * * "It is to these causes that Bacon's failure must be ascribed; for, grandly as he traces the various streams of error to their sources, he is himself borne along by these very streams whenever he quits the position of a critic and attempts to investigate the order of nature for himself." *

* Compare the articles on Bacon by Baron Liebig in *Macmillan's Magazine*.

(6.) We are next told that Aristotle's "notions of matter were entirely unphysical,† *, * * no real mechanical conception regarding it lying at the bottom of his mind." I don't know precisely what is here meant by "mechanical conception," having always thought that the notion of motion lay at the basis of all mechanical conceptions, instead of *vice versa*; but Alexander von Humboldt says: "Natural Philosophy deals with the general properties of matter; it is an abstraction from the manifestations of force in matter; and even where the basis of it was first laid, in the eight books of Aristotle's *Physical Discourses*, all the phenomena of nature are represented as the moving vital activity of a universal force." And he adds in a note: "All the changes in the condition of the physical world (*Körperwelt*) are reduced to *motion*—Aristot. *Phys. Ausc.* I. 1, 4." It is, indeed, hard to see how the notion of motion could have been "unphysical." But Whewell—from whose *History of the Inductive Sciences*, coupled with Lewes' work on *Aristotle*, Tyndall borrows pretty nearly all he knows about the Stagirite—is partly to blame for this misrepresentation.

(7.) We are next informed that Aristotle "affirmed that a vacuum could not exist, and proved that if it did exist motion in it would be impossible." And yet, a little farther on, Tyndall accuses Aristotle of saying that "there is an empty space, not at the front, but at the back of every man's head."‡ Now, if an empty space be not a vacuum (the Aristotelian term, *κενόν*, is the same in both cases), I do not know what it is. The fact is that Aristotle attempted to prove, and did prove, that an *independent, self-existing vacuum* (*χωριστον κενόν*) could not exist; i.e., that *vacuum* is merely a relative term opposed to *full*. But even had Aristotle tried to prove the other, I apprehend Professor Tyndall would have had some difficulty in refuting him. In his *Light and Electricity* (§ 218), speaking of Luminiferous ether, he says: "It fills space; it surrounds the atoms of bodies; it extends, without solution of continuity, through the humors of the eye." It would be interesting to know where Prof. Tyndall, with this belief, ever found a vacuum, or how he knows that, if it did exist, motion in it would be possible.

(8.) As one of Aristotle's grave and numerous errors in matters of detail, we are told that "he affirmed that only in man we had the beating of the heart." Now, Aristotle does not affirm anything of the kind. What he does say, in a very modest way, is this: "It has been incorrectly affirmed that the lungs contributed to the fluttering (*δλσις*) of the heart; this fluttering, *generally speaking*, takes place in man only, because he alone is affected by hope and expectation." (*On the Parts of Animals*, Book III. chap. vi.) In the 20th chapter of his work *On Respiration*, he is extremely careful to distinguish between beating (*σφυγμός*) and fluttering or leaping (*δλσις*, *πήδησις*).

(9.) A little farther on, we are assured that Aristotle "refers the ascent of water in a pump to Nature's abhorrence of a vacuum." Now, not to mention the fact that suction-pumps were not invented till long after the time of Aristotle, we venture to say that no such assertion occurs, even impliedly, in any of the works of Aristotle. Prof. Tyndall is here borrowing, and borrowing incorrectly, from Whewell (*Inductive Sciences*, vol. i. pp. 346 sqq.), who says: "Yet the effects of these causes were so numerous and so obvious, that the *Aristotelians* had been obliged to invent a principle to account for them; namely, 'Nature's Horror of a Vacuum.'" This is, I believe, the correct statement.

Perhaps enough has been said to give an idea of Professor Tyndall's knowledge of the history of philosophy and the development of human thought, as well as of his scientific habit of verifying his conclusions. But, if he is a mere tyro in the external history of philosophy, he is something worse in philosophy itself. Knowing no hierarchy in thought, he proceeds to solve the Universe with what he calls *Vorstellungen*, and, of course, finds himself helpless. He finds in matter "the promise and potency of every form of life." But, then, the existence of matter is a pure assumption, a metaphysical hypothesis, utterly incapable of being verified by experiment. It is conceived to exist in the external world; but the external world is, as Mill says, "the great battle-ground of metaphysics." Worse than this, it is the lost battle-ground of physics, which cannot venture on it at all. Prof. Tyndall wisely refrains from telling us what he thinks

about its existence, and contents himself with imparting to to us Mr. Spencer's method of cutting the Gordian knot, leaving us to suppose that he adopts the same. He says:

"With him [Spencer], as with the uneducated man, there is no doubt or question as to the existence of an external world. But he differs from the uneducated, who think that the world really *is* what consciousness represents it to be. Our states of consciousness are mere *symbols* of an outside entity which produces them and determines the order of their succession, but the real nature of which we can never know. In fact, the whole process of evolution is the manifestation of a Power absolutely inscrutable to the human intellect. As little as in the days of Job [cf. Renan, *Livre de Job*, Introd. pp. 87 sqq.] can man, by searching, find this Power out. Considered fundamentally, it is by the operation of an insoluble mystery that life is evolved, species differentiated, and mind unfolded, from their prepotent elements in the immeasurable past. There is, you will observe, no very rank materialism here."

Indeed there is not. Having rejected Aristotle and Metaphysics and gone back to Demokritos with his atoms, he, of course, arrives at chaos, and the only way he can escape from that is by leaping on the back of "an insoluble mystery." How does Mr. Spencer or Prof. Tyndall happen to be so well acquainted with this mystery as to know that it is insoluble? With what solvents has he ever experimented upon it? Aristotle, seeing plainly that with a material cause only, endow it how you may, a world could not be constructed, recognized a triunity of causes besides matter, viz. formal, efficient and final causes, and tried to develop the notions of them in the profoundest of his works. He steadily disbelieved in all insoluble mysteries, and bravely went to work to solve them. His three causes are no less capable of external verification than is matter, which he admits to be, *by itself*, unknowable.* This is admitted even by Lewes (*Aristotle*, p. 119). Now, on what ground do Spencer and Tyndall assume a material cause and reject all others, or relegate them to the region of mystery? That there are form, harmony and adaptation in the world as truly as there is matter, and that the former need explanation as much as does the latter, is sufficiently

* This need not be quoted as showing that Aristotle believed in insoluble mysteries.

evident. It is admitted that the promising, potent matter explains nothing, and yet it is assumed and eked out with an insoluble mystery. One mystery assumed as knowable, all else rejected as unknowable!

For example, it is assumed by Mr. Spencer that "our states of consciousness are mere symbols of an outside entity which produces them and determines the order of their succession, but the real nature of which we can never know." That is, our states of consciousness are symbols, but symbols of such a kind that they give us no information regarding the nature of the entity symbolized. Of course, then, we can have no knowledge respecting it. Notwithstanding this, Mr. Spencer appears to know a good deal about it. First, he knows that it is outside of us; second, that it is endowed with active powers; for, third, he knows that it is capable of producing symbols in us, and, fourth, he knows that it is capable of regulating the succession of the same. It would be interesting to know where he obtained all this information, and what more he thinks it would be desirable to know. Perhaps he would like to be able to form a *Vorstellung* of it; that is, to form a sensuous concept of it, just as Mr. Tyndall thinks he can form a "mechanical conception" of motion. But what if this "outside entity" were of such a nature as to be utterly beyond the reach of sensuous or mechanical conception? should we then be condemned to remain forever in ignorance of it? This, undoubtedly, is the theory arbitrarily maintained and unceasingly reiterated by Spencer and those who blindly follow his lead. "*Nihil est in intellectu quod non prius fuerit in sensu*"; and if we add "*nisi intellectus ipse*," they tell us that mind, too, is evolved from the prepotent elements of matter by the same inscrutable Power. But as matter by itself explains nothing, and that which we imagine to be the cause of everything is inscrutable, we know nothing of the real nature of anything. All that we know is symbols, which, we suppose, symbolize an outside entity, but in such a way as to give us no information as to its real nature.

It is easy enough to see what lies at the bottom of all this confusion, self-stultification, and self-confessed helplessness. The men who hold these views are in culpable ignorance of the history of the development of thought as well as of the

distinctions and limits in thought itself. With no preparation other than the perusal of a few compends and superficial treatises, and with no better implements than the *Vorstellungen* of the most naïve and confident common sense, they undertake to deal with the most difficult and momentous of problems, and, of course, come out with the confidently expressed result that these problems are insoluble. The assumption of matter and atoms is what the *Vorstellungskraft*, from its very nature, drives them to, and of that assumption they will never be able to rid themselves until they ascend to higher ground and are able thence to survey and explain their *Vorstellungen*. When they have done that, they will be driven to examine and define other causes in the Universe besides matter, and may then find their inscrutable mystery solved. The great fault of these men is their attitude of ignorant superciliousness toward the past, coupled with intellectual sluggishness and a confident use of undefined terms.

There are, however, not wanting signs to indicate that the days of supercilious ignorance and sluggishness are drawing to a close. It is almost amusing to hear George Henry Lewes, one of the most brilliant and superficial of the decriers of metaphysics, declare, in his last book, *Problems of Life and Mind*, that "the continuance of metaphysical inquiry is, for the present, inevitable." He was apparently brought to this sudden change of view by the example of J. S. Mill, who says: "England's thinkers are again beginning to see what they had only temporarily forgotten, that the difficulties of Metaphysics lie at the root of all science; that these difficulties can only be quieted by being resolved, and that until they are resolved, positively whenever possible, but at any rate negatively, we are never assured that any knowledge, even physical, stands on solid foundations." Such language is hopeful, and shows that the human mind can never be made to rest satisfied with the recognition of insoluble problems. Indeed the acceptance of insoluble mystery in regard to all things that have any real interest or value, leaves an open door for all the forms of superstition that debase and corrupt. It was the recognition of insoluble mystery introduced by Christianity, far more than the Chris-

tian system itself, that produced that stagnation and degeneration of the European mind which Prof. Tyndall so bitterly and so justly laments. And there are not wanting indications that to-day the same cause would produce the same result. Mr. Alfred R. Wallace, whose reputation as a naturalist is almost equal to that of Darwin, and who is almost as much entitled to be called the discoverer of the Darwinian theory as Darwin himself, has come to be a believer in Spiritualism on grounds entirely illogical. As Dr. Carpenter (*Principles of Mental Physiology*, p. 627) says: "Such men seem totally oblivious of the difference between *external* and *internal* evidence—the testimony of our *senses* (or those of other individuals) and that of our *sense*." And this, though the most remarkable, is not a solitary instance. While, therefore, I entirely sympathize with Prof. Tyndall in his manly and determined opposition to dogma and authority, and in his demand for the free and unprejudiced discussion of all questions, I cannot but be sorry that he has diminished the weight of his own authority, and thus injured a cause which is that of all earnest truth-seekers, by trying to draw conclusions in regions of thought where he is an entire stranger, and by being thus entrapped into making a display of carelessness in regard to matters of fact and of incapacity to grasp philosophic truth.

NOTES AND DISCUSSIONS.

*Professor Tyndall's Address.**

The recent "Inaugural Address before the British Association" by Professor Tyndall, in which he has taken occasion to define his attitude toward the current theories of the source of all phenomena, has excited interest on all hands. His bold statement regarding the potency of matter to produce every form and quality of life is a challenge to all thinkers who hold to the supremacy of Personality as the first principle of the Universe, particularly that portion of the address in which the Professor follows closely the Spencian version of the doctrine of the Unknowable. Before all things, the writer on these subjects should be acquainted with the history of human thinking. Such acquaintance presupposes in one's self, however, the ability to think, for no one can recognize thought in another unless he rethinks the thought himself. Those who cannot solve the antinomies of reflection are necessa-

* Reprinted in Appleton's *Popular Science Monthly* for October, 1874.